# Urban and Rural Designations:

## The Impact on Rural Healthcare in California

by

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### Summary

The financial challenges of delivering healthcare services in California are not unique to rural healthcare providers. However, the challenge of being consistently recognized as a "rural" provider is unique and critical to the sustainability of these providers. Funding opportunities such as rural health grants and Medicare reimbursement are often based on the rural designation of a healthcare provider. But "rural" is a difficult concept to capture in a single, standard definition. Rural classification systems vary widely depending on specific policy applications. There are currently several distinct, inconsistent rural definitions being applied by federal and state programs to establish rural funding eligibility. Inconsistent definitions can create exceedingly difficult circumstances for rural healthcare providers that are required to clearly and consistently demonstrate their rural status in order to apply for public funds. In turn these circumstances present an ongoing challenge to the sustainability of many rural healthcare providers, fail to support long-term strategic planning by providers, and ultimately threaten access to healthcare services for rural populations in California.

This paper intends to demonstrate that the different definitions employed by the federal government to designate rural areas diminish the ability of rural healthcare providers to equitably compete for much needed public funds. Consideration is first given to the term "rural." Issues regarding administrative boundaries are discussed, with particular attention paid to California boundaries as compared to other states and the inconsistencies of traditional boundaries. The importance of rural designations is then presented through the linkage of government funding programs and rural eligibility requirements. The need for

public funds in support of rural healthcare services is also addressed. Recent issues regarding rural eligibility requirements administered by two particular federal agencies are then detailed for further analysis in the paper. Specifically, the federal Department of Health and Human Services [DHHS] houses two agencies that include programs that distribute substantial funding based on differing rural eligibility requirements. The rural definitions employed by each of these agencies to determine rural eligibility are discussed and critiqued for their relative impacts on rural health in California. The State of California maintains a classification system for designating rural areas that is also relevant to the federal funding conversation, and considered here for its effectiveness relative to the federal definitions presented. The methods and approach employed by the California's Office of Statewide Health Planning and Development [OSHPD] are offered as a case study in establishing administrative boundaries, and OSHPD suggests some lessons learned in the process. The paper concludes with observations regarding current rural definitions, consideration of driving forces that will impact rural healthcare communities in the future, and recommendations for possible alternative rural classification approaches that more effectively support the sustainability of rural healthcare access in the long view.

## Background

*What is rural?* It is difficult to clearly and objectively define the term "rural." Rural can be a vague concept; a simple notion; a subjective state of mind. However government programs are often required some to classify rural and urban to administer policies and programs. Not surprisingly, many definitions have evolved but seldom are these rural definitions in agreement (USDA). It is agreed that rural is not "urban" or "metropolitan." Urban reflects

the characteristics of cities and metropolitan areas, dense infrastructure and densely settled populations. A rural area is sparsely settled and comprised of open country, generally in the context of agricultural, forest, or desert environments depending on the particular region of study. These [rural] features exist on a continuum, however, while federal policies rely on dichotomous definitions (Hewitt). The two definitions most frequently used by the federal government define rural areas as those areas *not* classified as urban or metropolitan based on population criteria.

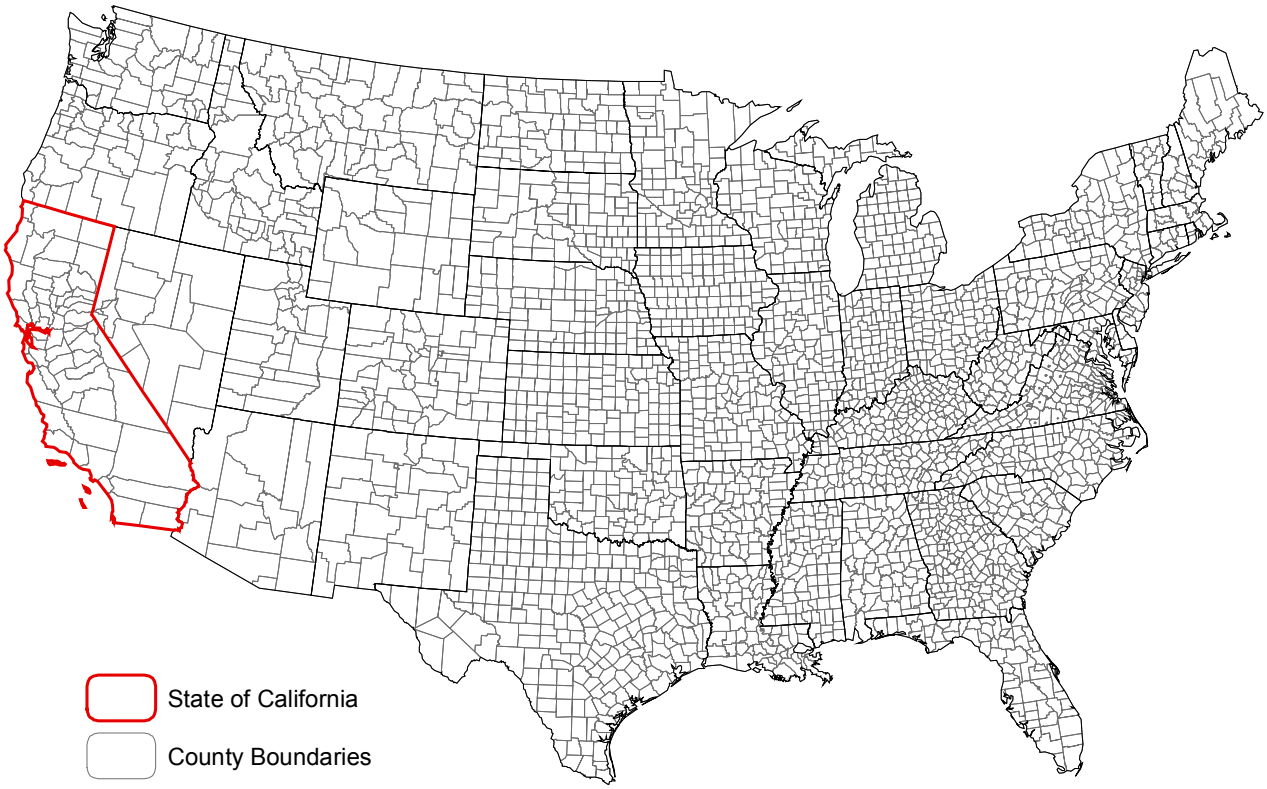
"Building blocks" are necessary to calculate population and distinguish urban from rural areas. The building block, or geographic unit, most commonly used is the county. The U.S. Office of Management and Budget [OMB] uses counties as the basis for determining metropolitan areas [MA], which in turn define nonmetropolitan, or rural areas. County boundaries are therefore very important to the issue of rural classification. Specifically because it is difficult to accurately identify rural populations in California using county boundaries as the unit of analysis.

Consider how the California counties evolved. What would eventually be the State of California included mostly Mexican territories. California was placed under the jurisdiction of the United States in 1848, following the end of the Mexican War. The first session of the California Legislature created the original 27 counties in 1850 (CSAC). Over the next fifty years, many counties were divided creating new counties. Then, a constitutional amendment in 1894 made it very difficult to establish new counties. By 1907, the last new county was formed and we operate in the same 58 counties today. Dan Walters asserts, "California has not changed a county boundary since 1907, even though the state itself has

changed in almost every respect since then." The demographic landscape of California is certainly included in the many changes of the last century.

Today California is home to the largest share of the U.S. population, reporting 12 percent of the country's total population in 2000, according to Census 2000 summary data. Many western states, including California, contain large counties relative to older, eastern states in the country. It is understood that colonial towns evolved during a different era and under different rationale than did the Mexican territories passed to California, eventually forming the state's counties. A significant majority, 42 of 58 California counties measure 1,000 square miles or more. Seven of those counties measure 5,000 square miles or more.

**Figure 1. United States County Boundaries**



The challenge becomes apparent when attempting to accurately describe approximately 34 million people residing across 156,000 square miles of land with only 58 relatively large county units. New York State, in comparison, reports a population of 19 million residing across 47,000 square miles delineated by 62 counties. With four more county units than California, but little more than half the population and only a third of the land area of California, New York State populations can more effectively be captured and studied using county units. Likewise, Georgia boasts 159 counties home to just over 8 million people, and Kentucky has 120 counties with just over 4 million people. California is simply at a disadvantage when attempting to delineate and describe populations by county.

The problem with large county units is widely understood by those engaged in the study or rural definitions. John Cromartie and Linda Swanson indicate, "Counties are too big in many parts of the Nation to serve as building blocks for statistical areas used to analyze changing settlements." More precise units of measure are required to accurately delineate rural populations, and more importantly identify the demand for healthcare services in rural communities. Several such geographic units are discussed herein relative to their application in rural classification systems.

## Selected Rural Definitions

*What are the definitions being used to determine the rural status of healthcare providers?*

There are a number of rural classification systems developed by federal and state government used to define rural areas and subsequently determine eligibility for specific rural health funding opportunities. Four definitions with the most significant impact on

California are considered herein. There are two principal definitions of rural used by the federal government: the OMB's Metropolitan - Nonmetropolitan system and the U.S. Census Bureau's "Urban - Rural" classifications of populations (Ricketts). The Rural-Urban Commuting Area [RUCA] is a third definition recently introduced by the Federal Office of Rural Health Policy [ORHP]. The State of California, Office of Statewide Health Planning and Development [OSHPD], offers a fourth rural definition based on their Medical Service Study Area [MSSA] boundaries.

**Table 1. Four Rural Classification Systems**

| Classification System | Developer | Classes | Geographic Unit |
|---|---|---|---|
| Metropolitan and Nonmetropolitan, Metropolitan Areas [MA] | US Office of Management and Budget | 2 | County |
| Urban and Rural, Urbanized Areas [UA] | US Census Bureau | 2 | Census Block, Block Group |
| Rural Urban Commuting Areas [RUCA] | US Department of Health and Human Services, Health Resources and Services Administration, Federal Office of Rural Health Policy | 10 | ZIP Code |
| Rural Medical Service Study Areas [MSSA] | State of California, Office of Statewide Health Planning and Development | 3 | Census Tract |

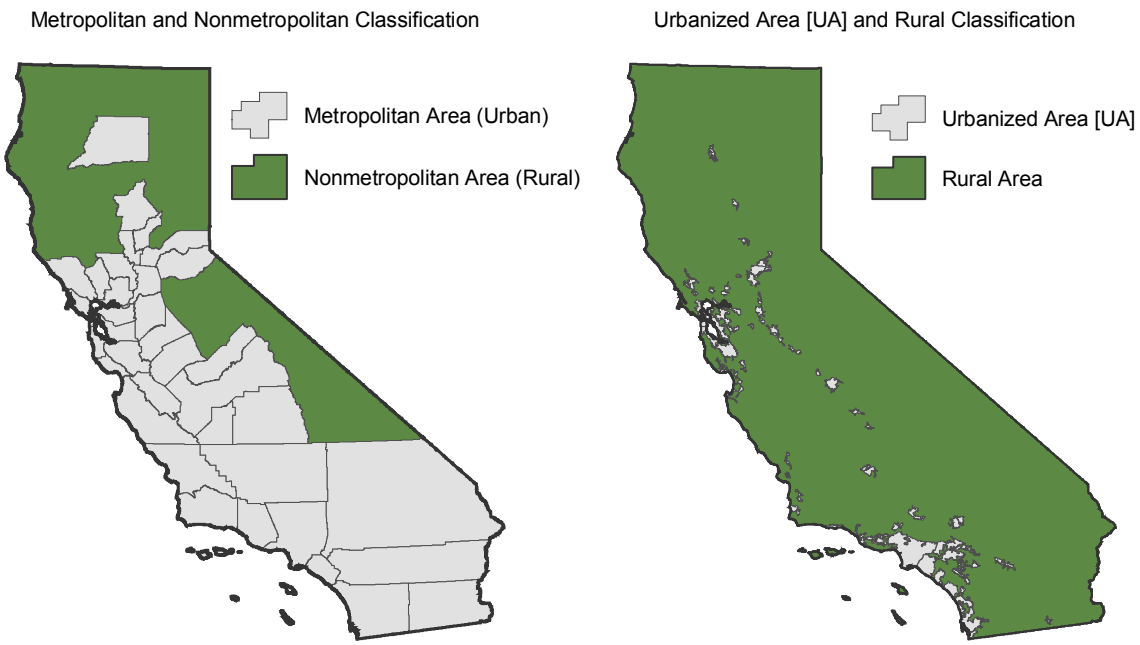
The metropolitan area [MA] program has provided standard statistical area definitions for 50 years (OMB). Based on county or counties, the metropolitan and nonmetropolitan system includes only two classes. Metropolitan or urban areas are defined according to OMB standards, then nonmetropolitan or rural areas are defined by exclusion; any area that is not metropolitan/urban is nonmetropolitan/rural (USDA). The OMB adopted new standards in 2000 for defining metropolitan and now micropolitan statistical areas, together referred to as Core-Based Statistical Areas [CBSAs]. The new CBSA standards are available in the Federal Register [Federal Register: December 27, 2000 (Volume 65, Number 249)]. A

metropolitan CBSA, or metropolitan area, consists of a county containing at least one urbanized area or incorporated place with a population of at least 50,000 along with any adjacent counties that have at least 25 percent of employed residents of the county who work in the metropolitan area's core or central county. Figure 2 demonstrates that a majority of land area in California is now classified as metropolitan/urban by the OMB MA definition.

The U.S. Census Bureau also uses a two class, exclusionary system to delineate rural from urban areas, but using much more detailed units of census geography. An urbanized area [UA] is defined by population density, based on core and surrounding census blocks and block groups. According to this definition, each UA includes a central city and the surrounding densely settled territory that together have a population of 50,000 or more and a population density generally exceeding 1,000 people per square mile (USDA). All area and population not classified as urban are designated rural. Detailed Census 2000 Urban and Rural Classification criteria are also available in the Federal Register [Federal Register: March 15, 2002 (Volume 67, Number 51)]. It is important to note that the Census Bureau's urban-rural classification scheme can cross county boundaries, which can conflict with the OMB metropolitan-nonmetropolitan definition. Furthermore:

> Rural and urban areas and populations identified by the OMB and Census systems have substantial disparities. In 1990, 37.3% of nonmetropolitan people lived in urban areas and 13.8% of metropolitan people were classified as rural. This incomplete overlap represents one of several problems in accurately describing rural and urban populations using these two, dichotomous systems of classification. (Ricketts)

Figure 2. Standard Federal Classifications of Metro/Urban Areas and Nonmetro/Rural Areas




Alternatives to these standard systems have been created by many federal and state agencies in order to better target rural programs. The Federal Office of Rural Health Policy [ORHP], housed in the Health Resources and Services Administration [HRSA] of the Department of Health and Human Services [DHHS], historically used the OMB metropolitan area system to determine eligibility for the office's Rural Health grants. Recognizing the shortcomings of the MA definition, OHRP developed something called the Goldsmith Rural Modification in the early 1990s to identify rural census tracts within metropolitan areas. The method was never adopted on a wide basis, and in the late 1990s OHRP funded the development of the rural-urban commuting area [RUCA] codes in order to designate rural areas within metropolitan areas (ORHP). The U.S. Department of Agriculture's [USDA] Economic Research Service [ERS] first developed the RUCA coding method using census tracts to provide the flexibility needed to address the shortcomings of the county-based MA classification system. Like the widely used metropolitan areas, the rural-urban commuting

area code is based on measures of urbanization, population density, and daily commuting. Census tracts are used because they are the smallest geographic building block for which reliable commuting data are available (ERS). The RUCA code classification actually works on a continuum including ten 10 primary codes and 30 secondary codes, based on population and commuting data from the 1990 Census.

**Table 2. Rural-Urban Commuting Area [RUCA] Codes**

| | |
|---|---|
| 1 | Metropolitan-area core: primary flow within an urbanized area [UA] |
| 2 | Metropolitan-area high commuting: primary flow 30% or more to a UA |
| 3 | Metropolitan-area low commuting: primary flow 5% to 30% to a UA |
| 4 | Large town core: primary flow within a place of 10,000 to 49,999 |
| 5 | Large town high commuting: primary flow 30% or more to a place of 10,000 to 49,999 |
| 6 | Large town low commuting: primary flow 5% to 30% to a place of 10,000 to 49,999 |
| 7 | Small town core: primary flow within a place of 2,500 to 9,999 7.0 No additional code |
| 8 | Small town high commuting: primary flow 30% or more to a place of 2,500 to 9,999 |
| 9 | Small town low commuting: primary flow 5% to 30% to a place of 2,500 to 9,999 |
| 10 | Rural areas: primary flow to a tract without a place of 2,500 or more |
| 99 | Not coded: Tracts with little or no population and no commuting flows |

Source: U.S. Department of Agriculture, Economic Research Service

However, ORHP programmatic needs only require that a unit be identified as rural or not. A determination was made to simply break the RUCA code continuum into two classes. Consequently, census tracts with RUCA codes 4 through 10 are considered rural for the purposes of Rural Health grants (ORHP). Codes 1 through 3 remain urban by default. ORHP also contracted with the Washington, Wyoming, Alaska, Montana, and Idaho [WWAMI] Rural Health Research Center at the University of Washington to create ZIP Code approximations for the original census tract-based RUCA codes. Approximations of

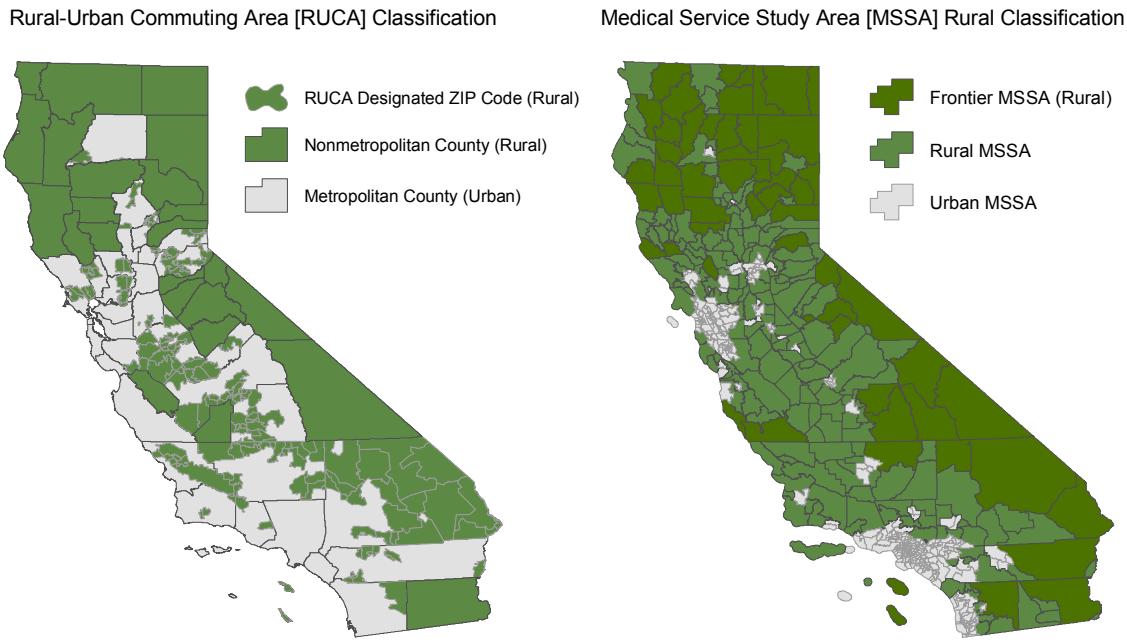
1990 census tract RUCA codes were developed using1998 ZIP Codes acquired from a commercial data vendor. WWAMI and ORHP established a list of designated ZIP Codes based on RUCA code approximations 4 through 10. Healthcare providers located in designated ZIP Codes are considered “rural” and eligible to apply for Rural Health grants.

Policy makers in the State of California also recognized early on that county-based statistical systems mask significant disparities in population density between the urban and rural areas within many counties, as well as disparities in the socioeconomic status of populations within counties and cities. In 1976, California enacted legislation requiring the development of a geographic framework for delineating rural from urban areas in the state, and for determining areas within counties and cities that had adequate healthcare resources and areas that were “medically underserved.” The medical service study areas [MSSAs] were developed using combinations of census-defined geographic units, based on General Rules established by a statutory commission (Burnett). The MSSAs are revised following each census.

The guidelines for establishing medical service study areas [MSSAs] strike something of a compromise between the federal systems outlined above. A medical service study area is composed of one or more complete census tracts, cannot cross county boundaries, and meets some basic population criteria in cities and distance criteria established between population centers. The population density within each MSSA defines the areas rural status, similar to the approach of the Census Bureau’s UA definition. To be designated rural, a MSSA must report population density of less than 250 persons per square mile, and contain no census-defined place with population exceeding of 50,000 within the area. A population density of less than 11 persons per square mile qualifies as a “frontier” MSSA.

However, a frontier designation is considered no different than a rural designation in terms of funding eligibility (i.e. there are no specific frontier funding programs at this time). Any MSSA that is not designated rural or frontier is, by exclusion, an urban MSSA.

**Figure 3. Urban and Rural Classifications used by Federal and State Rural Health Agencies**




*How do these four rural classification systems delineate California's land and population?*

Table 3 presents a comparison of the four selected rural definitions. The land area and total population from Census 2000 are calculated for rural and urban areas in each case. The metropolitan area [MA] definition experienced a substantial increase in "urban" designated area under the new Core-Based Statistical Area [CBSA] guidelines recently adopted by OMB. The definition now identifies a majority, almost 64%, of California as metropolitan/urban. As of April 2003, ORHP is applying RUCA designations in combination

with the MA counties defined in 1999, prior to the new CBSA definition and therefore might also experience an increase in metropolitan/urban area if and when adopted by ORHP.

**Table 3. Land Area and Population Comparison of Selected Rural Definitions**

| | Area (square miles) [1] | | 2000 Population | |
|---|---|---|---|---|
| | Area | Percent of Total | Population | Percent of Total |
| California Statewide Total | 158,101 | 100.0% | 33,871,648 | 100.0% |
| **Metropolitan Areas [MA]** | | | | |
| Metropolitan/Urban | 100,700 | 63.7% | 33,075,450 | 97.6% |
| Nonmetropolitan/Rural | 57,401 | 36.3% | 1,121,254 | 3.3% |
| **Urbanized Areas [UA]** | | | | |
| Urbanized | 6,586 | 4.2% | 29,950,008 | 88.4% |
| Rural | 151,515 | 95.8% | 3,921,640 | 11.6% |
| **Rural-Urban Commuting Areas [RUCA]** | | | | |
| Urban | 54,496 | 34.5% | 30,835,839 | 91.0% |
| Rural [2] | 103,605 | 65.5% | 3,035,809 | 9.0% |
| **Medical Service Study Area [MSSA]** | | | | |
| Urban | 13,452 | 8.5% | 28,853,459 | 85.2% |
| Rural | 144,649 | 91.5% | 5,018,189 | 14.8% |

1. Area figures were calculated using geographic data files and may not match Census 2000 land area data.
2. Only 223 of 233 eligible RUCA ZIP Codes were matched due to inconsistencies in ZIP Code databases.
Source: U.S. Census Bureau, Census 2000, http://www.census.gov/

## Eligibility for Rural Health Funding

*Why are rural designations important to rural healthcare providers in California?* The California State Rural Health Association [CSRHA], in a recent policy brief regarding the

importance of appropriate rural definition in California, clearly articulates the current healthcare climate the state's rural communities:

> Access to adequate healthcare services continues to be a major challenge that rural Californian's must face. Over the last four years, nine of California's rural hospitals have been forced to close down. HMO's have decreased or ceased coverage in rural areas and many rural residents must travel long distances to the nearest clinic or hospital. Currently 15 percent of children in rural areas are uninsured, making them more likely to experience problems with access to medical care, delays in necessary treatment and inadequate immunizations. In addition, California's rural areas have a higher proportion of elderly residents, more than half of whom have family incomes below 200 percent of the poverty line who have been found to have greater long-term health problems. Yet many of California's rural hospitals and clinics continue to struggle to stay open, while primary care physicians, physician's assistants, and nurse practitioners are in short supply. (CSRHA)

Rural residents report that transportation is often a tremendous barrier to access to healthcare services. Even communities located relatively near to urban areas might still retain uniquely rural characteristics. Based on proximity though, it is assumed that access to healthcare services is available in nearby urban areas. However, low income or uninsured individuals and families indicate that this is not necessarily the case. Access to healthcare is an issue to rural populations across the state.

California's rural providers serve more than 3 million residents that otherwise have difficulty obtaining primary healthcare in isolated rural areas. There are essential funding opportunities available to recognized rural providers. A healthcare provider that serves a rural community and needs to apply for public funds to sustain its offering of healthcare

services must be designated rural to qualify or compete for rural specific funding. Urban areas typically experience the usual market conditions that afford residents close access to a broad range of healthcare services. However rural areas, with their small populations, sparse settlement and remoteness, often need Federal government assistance in order to maintain a variety of essential health services (Goldsmith). Rural providers are often forced to run their organizations on very thin operating margins; so thin at times that rural clinics have been known to put capital grant funds toward meeting payroll for a given week (Maestas). Rural providers have become necessarily adept at stretching even small grants of a few thousand dollars to cover costs and keep the doors open. Despite the need, both Federal and California State governments have either cut or plan to cut rural health funding levels in their respective budgets. According to the National Rural Health Association's most recent Advocacy Alert, President Bush has proposed an approximate 70 percent cut to Health Resources and Services Administration's rural specific programs, for fiscal year 2005. Also concerning are changes in Medicare Regulations published to the Federal Register in 2003. Pending amendments to Medicare reimbursement requirements could impact the payment limits imposed on small, hospital-based Rural Health Clinics.

Reductions in the already slim rural health funding programs may be eminent, but the funds available today are highly coveted and the distribution of these funds can be quite competitive. Healthcare providers need a rural designation to equitably compete for these particular funds. Table 4 presents a number of funding programs specific to rural health, the agency responsible for the program, the program funds distributed to California providers in 2003, and the rural eligibility requirement or definition applied by each agency to determine the rural status of a healthcare provider applying for funds.

## Table 4. Rural Funding Opportunities and Eligibility Requirements

| Funding Program | Lead Agency or Authority | Rural Eligibility Definition | 2003 Funds |
|---|---|---|---|
| Federally Qualified Health Center [FQHC] | US Department of Health & Human Services Centers for Medicare & Medicaid Services Public Health Services Act, Section 330 | Nonmetropolitan Area (OMB) | *$ 350,000,000 ** |
| Rural Health Clinic [RHC] Medicare Reimbursement | US Department of Health & Human Services Centers for Medicare & Medicaid Services Rural Health Clinic Services Act | Rural Area not in UA (Census) | $ 72,500,000 |
| Rural Health Outreach Grant | US Department of Health & Human Services Health Resources & Services Administration Office of Rural Health Policy [ORHP] | Nonmetropolitan Area (OMB) or RUCA Designated ZIP Code (ORHP) | $ 564,630 |
| Rural Health Network Development Grant Program | US Department of Health & Human Services Health Resources & Services Administration Office of Rural Health Policy [ORHP] | Nonmetropolitan Area (OMB) or RUCA Designated ZIP Code (ORHP) | $ 598,995 |
| Rural Health Network Development Planning Grant | US Department of Health & Human Services Health Resources & Services Administration Office of Rural Health Policy [ORHP] | Nonmetropolitan Area (OMB) or RUCA Designated ZIP Code (ORHP) | *new program* |
| Rural Access to Emergency Devices Grant Program | US Department of Health & Human Services Health Resources & Services Administration Office of Rural Health Policy [ORHP] | Nonmetropolitan Area (OMB) or RUCA Designated ZIP Code (ORHP) | $ 199,296 |
| Small Rural Hospital Improvement Program | US Department of Health & Human Services Health Resources & Services Administration Office of Rural Health Policy [ORHP] | Nonmetropolitan Area (OMB) or RUCA Designated ZIP Code (ORHP) | $ 398,848 |
| Rural Hospital Flexibility Grant | US Department of Health & Human Services Health Resources & Services Administration Office of Rural Health Policy [ORHP] | Nonmetropolitan Area (OMB) or Goldsmith Modification (ORHP) or statutory designation by legislation | $ 326,200 |
| Telehealth Network Grant Program | US Department of Health & Human Services Health Resources & Services Administration Office for the Advancement of Telehealth | Nonmetropolitan Area (OMB) or RUCA Designated ZIP Code (ORHP) | *unavailable* |
| Rural Health Services Development Program | California Department of Health Services | Rural MSSA (California OSHPD) | $ 8,203,000 |
| Seasonal Agricultural and Migratory Workers Program | California Department of Health Services | Rural MSSA (California OSHPD) | $ 6,871,000 |
| **Rural specific program funds distributed to healthcare providers serving rural California in 2003** | | | **$ 89,661,969** |

* $350,000,000 is the total approximated amount of Section 330 grant funds paid to both urban and rural FQHCs in 2003. Rural funding amounts were not disaggregated from the total and therefore not included in the rural funding summary.

Source: U.S. Department of Health and Human Services, CMS and HRSA

## Analysis & Discussion

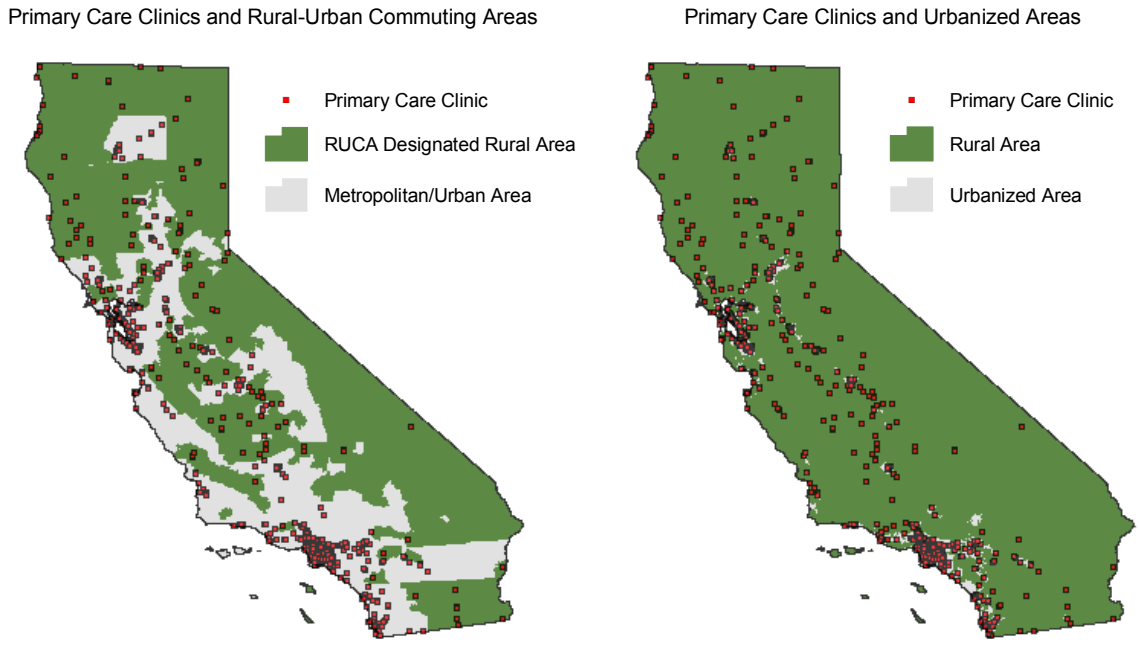
Significant concerns have been raised in public testimony delivered to the California Rural Health Policy Council [CRHPC] regarding the impact of various federal rural definitions on rural providers in California. In particular, 2003 brought many questions about the RUCA methodology and its effect on rural funding eligibility with the Federal Office of Rural Health Policy. 2004 brought questions about the Rural Health Clinic eligibility requirements and payment caps under new Medicare Regulations pending adoption by CMS. These questions persist today. Each issue, or the agency responsible for the issue, also has some administrative relationship with the medical service study area [MSSA] classification system maintained by the State of California. The following section addresses the issues and relationships that are of current interest to the California rural health community.

*How does the RUCA definition affect healthcare providers in California?* Table4 demonstrates that the rural-urban commuting area [RUCA] rural classification, introduced in 2003 by the Federal Office of Rural Health Policy [ORHP], has quickly become a de facto standard of the Health Resources and Services Administration [HRSA] in making rural eligibility determinations for their various grant funding programs. It is interesting in that the RUCA methodology was never published in the Federal Register or approved by any statutory authority that allows for public comment, as were the other rural definitions presented above. Yet in a very short time the RUCA has become instrumental in establishing the competitive grounds for most of HRSA's rural specific programs, and certainly all Rural Health grants administered by ORHP. Application of the RUCA methodology has created some challenging circumstances in California's healthcare community that call for discussion.

ORHP adopted the RUCA methodology in order to identify rural areas within OMB defined metropolitan areas [MAs]. It was a move in the right direction because the inconsistencies of the county-based OMB system are well known to policy makers and program managers (i.e. urban counties often include substantial rural populations). However, the RUCA definition fails to accurately identify many rural areas in practical application across the State of California. Table 3 indicates that the RUCA approach delineates approximately 65% of the state's land area as rural, which leaves approximately 35% of the state as urban area. The more precise, population density based UA definition provided by the U.S. Census Bureau demonstrates that less than 5% of California consists of urbanized areas. Discrepancies in the delineation of rural areas under the RUCA methodology result in rural healthcare providers not recognized as rural and subsequently deemed ineligible to apply for Rural Health grants from ORHP. For example, 10 of the 69 rural hospitals in California are not classified as rural by the RUCA system. Fortunately, rural hospitals in California are designated rural by statute via the legislature. Unfortunately, Rural Health Clinics, licensed primary care clinics, and other providers operating in rural communities do not have the statutory protection that rural hospitals enjoy in California. There are 407 Rural Health Clinics [RHCs] operating in California, according to HRSA. RHCs are certified rural by CMS, under the Census Bureau's urbanized area [UA] system. 25 percent (101) of the 407 RHCs in California would no longer be classified rural if CMS applied the RUCA definition to its certification process. Licensed primary care clinics serving rural communities must qualify as rural under the RUCA definition to meet ORHP eligibility requirements necessary to apply for any Rural Health grants. Currently, 133 of 799 primary care clinics in California are designated as rural using the RUCA system. By comparison, 40 percent more clinics (187 of 799) are classified as rural according to the U.S. Census Bureau's definition, because they are located outside of urbanized areas. However, those additional 54 clinics

are not eligible to apply for Rural Health grants because ORHP and HRSA do not recognize that they are legitimately rural providers delivering healthcare services to rural communities.

**Figure 4. Comparison of Primary Care Clinics against Two Federal Classification Systems**




Rural constituencies, advocacy groups, and the State of California have identified several issues concerning the effectiveness and appropriateness of the RUCA classification. Issues include the use of ZIP Codes to transform and administer census tract-based information, the absence of any stakeholder or public participation in the process of establishing rural designation methodology, and the lack of any mechanism to receive public comment or accept feedback from stakeholders affected by the results of a newly applied rural designation methodology.

The USDA Economic Research Service [ERS] has studied “rurality” for many years. The ERS has long understood that the inconsistent size of counties sometimes creates a

mismatch between the defined areas and actual research or programmatic needs (ERS). In response, the ERS has developed several academic solutions based on census data, including rural-urban continuum codes, urban influence codes, and most recently the rural-urban commuting area codes. The original rural-urban commuting area [RUCA] codes are offered as a flexible approach to delineating components of the U.S. settlement systems, using census tracts instead of counties (ERS). Based on the more than 5,000 California census tracts in 1990, the RUCA codes 1 to 10 undoubtedly offer an effective tool to examine a range of commute patterns among population centers. However, issues and concerns emerge when ORHP requested the WWAMI Rural Health Research Center to prepare ZIP Code approximations of the census tract-based RUCA codes. The WWAMI group cites the reasoning behind the ZIP Code RUCA transformation is that, "the smallest geographic identifiers available for most health care data sets are ZIP Codes." If the purpose, as stated, of the RUCA ZIP Code approximations is to "designate 'rural' areas within metropolitan areas [MAs]," then any justification regarding healthcare data set identifiers seems irrelevant. ORHP makes no claims as to the strength of healthcare research performed using RUCAs as geographic units of analysis. It would be a mistake to make such claims because the research community is well aware of the weaknesses inherent in using ZIP Codes as a geographic unit for any other purpose than delivering mail. ZIP Codes are not standard units, and the fact that ZIP Codes are not required to be polygons (bounded areas) makes them difficult to map (Census). The boundaries of mail delivery routes change as required by the U.S. Postal Service [USPS]. Frequent changes in the USPS address database are reflected in new versions released every two months. In California, there are approximately 2,000 ZIP Code areas, 3,000 if you include "enclosed" ZIP Codes (unique, individual ZIP Codes assigned to a single building or post office). The WWAMI group reported using a commercial ZIP Code database for 1998. An equivalent,

commercial ZIP Code database for 1998 was used when constructing the RUCA map in Figure 3. Only 166 of the 233 eligible ZIP Codes listed for California by ORHP were matched in the database. The match number jumped to 223 of 233 when using the latest 2004 ZIP Code database in a geographic information systems [GIS] data format. What would an applicant do to locate the other ten ZIP Codes? The inconsistencies inherent in ZIP Codes make them ineffective as units of measure or analysis. The administrative ease of ZIP Codes continues to be an attractive characteristic, because everyone knows his or her ZIP Code. However, the consistency, accuracy, and homogenous characteristics of census geography make it much more attractive than ZIP Codes for research and analysis, and consequently the benefits of collecting census-based data will outweigh the costs.

The RUCA methodology, as originally developed by the USDA's research service, is an academic solution that supports rural research. The WWAMI Rural Health Research Center layered a second academic solution on to the census tract-based RUCA methodology by applying mathematical algorithms to derive ZIP Code approximations of the RUCA codes. Then the RUCA codes ranging from 1 to 10 were spit into two dichotomous designations, codes 1 to 3 are urban areas and 4 through 10 are rural areas. Given the steps involved, points in the process will undoubtedly fail to uniformly apply across a nation as diverse and heterogeneous as the United States. Nonetheless, a methodology essentially produced in a think tank[s], has been administered by the ORHP without any opportunity by affected stakeholders to participate in the process of delineating rural from urban areas. Comments were not solicited regarding the proposed methodology, or the classification results. The changes to Medicare regulations discussed below are published in the Federal Register, and all public comments are answered by the responsible agency. No such process was offered by ORHP when developing or adopting

the RUCA methodology. Likewise, there is no legislative or regulatory basis for the RUCAs. Both OMB and Census Bureau definitions are established standards that can be reviewed in the Federal Register. The California MSSA system is based on General Rules approved by a statutory commission, open to public comment at publicly held meetings, and the MSSA boundaries are specifically defined through local stakeholder participation at public community meetings. RUCAs have been imposed on communities with no opportunity for comment, but the rural classifications resulting from the methodology affect the rural eligibility of all rural healthcare providers and influence where millions of dollars in grant funds are distributed across the country.

A number of legitimately rural healthcare providers in California are not recognized as rural under the RUCA designation, making them ineligible for any rural health funds available through the ORHP grant programs (Shaplin). Last year, total ORHP funding was just under $40 million, of which approximately $2 million was awarded to California providers. The inability of rural providers to compete equitably for these rural funds presents a significant impact to delivery of healthcare services in rural California. A small group of rural health advocates recently traveled to Washington D.C. and met with the executive leadership of HRSA. The group requested that California be exempt from the RUCA designations, and instead apply the rural MSSA classification to establish eligibility for federal rural health funds. The request was denied. Why not use rural boundaries that were established through a completely public process that embodies local knowledge of each rural community? Or if HRSA requires a federal standard, why not adopt the Census Bureau's UA definition that is precise enough to level the playing field for rural providers that hope to equitably compete for Rural Health grants?

*How are Rural Health Clinics affected by rural definitions?* The Rural Health Services Act (Public Law 95-210), passed by Congress in 1977, intended to increase the availability and accessibility of primary healthcare services for residents in rural, underserved communities. The Act is a financing mechanism for expanding cost-based Medicare and Medicaid reimbursement to any type of public or private sector healthcare provider (i.e. physician, clinic, hospital, skilled nursing facility, or home health agency) that qualifies as a Rural Health Clinic [RHC]. The Act also expanded Medicare and Medicaid coverage for services provided by nurse practitioners [NPs] and physician assistants [PAs], even when delivered at a clinic in the absence of a physician (Gale). This provision is important because rural communities often have difficulty attracting and retaining physicians. Initial participation in the RHC program was slow to grow. However, with changes in the financial climate of the healthcare industry in the late 1980s and improved reimbursement measures passed by Congress, participation in the program grew rapidly during through the 1990s. The dramatic increase caught the attention of the U.S. General Accounting Office (GAO/HEHS-97-24, Nov. 22), which produced a study that questioned the extent to which the RHC program actually improved access for underserved populations in rural communities (Gale). The program continues today with over 3,000 Rural Health Clinics nationwide.

To participate in the RHC program, a healthcare provider or facility must apply for certification as a Rural Health Clinic. A provider must be located outside of an urbanized area [UA], as defined by the U.S. Census Bureau, to qualify for the rural designation required of an RHC. The provider must also be located in a medically underserved area [MUA] or health professional shortage area [HPSA] as designated by the U.S. Department of Health and Human Services, Health Services and Resources Administration [HRSA]. The relationship with the California MSSAs enters here, because HRSA has adopted the

MSSA boundaries for use in the administrative process of designating MUAs and HPSAs. The UA rural definition used in the RHC certification process is actually the best the federal government has to offer. Table 3 indicates that the urbanized area definition identifies almost 96% of California as rural area. This is an accurate definition because of the precise nature of census blocks, which are used as the geographic unit. The truly dense populations across the state are tightly drawn using these units, delineating over 88% of the state's population into only 4% of its land mass. But while the UA definition is certainly the most equitable, standardized rural classification offered by the federal government, there remains some disconnect in the consistency of RHC certifications. The MSSA system includes a rural definition component in addition to underserved area and shortage area delineation components. Why not establish geographic consistency by using the MSSA boundaries to designate both rural areas and healthcare shortage areas, thus alleviating an obvious definitional disparity that currently exists between the two?

The issue of consistent area designations used in RHC certification becomes less important, however, because many RHCs have converted over to something called a Federally Qualified Health Center [FQHC] designation. FQHC designations are available to freestanding community clinics that meet specific eligibility requirements, stricter than the RHC program. Most eligible clinics have completed this conversion, which leaves primarily two provider types in the RHC program; hospital-based and physician private practices. Rural Health Clinics are eligible for Medicare reimbursement and assigned a single payment limit, $68.65 for the 2004 calendar year. Pending changes to the RHC eligibility requirements under Medicare Regulations pertain to the renewal of shortage area designations and exceptions to payment limits for small and rural hospital-based RHCs.

Neither of these issues is impacted directly by the rural definitions addressed in this paper. However, FQHC eligibility requirements are definitely affected by rural designations.

*How are Federally Qualified Health Centers affected by rural definitions*? Federally Qualified Health Centers [FQHCs] include all organizations receiving grants under section 330 of the Public Health Service Act. FQHCs are eligible for enhanced reimbursement from Medicare and Medicaid, as well as other benefits. Table 4 indicates that in 2003 Section 330 monies coming into California FQHCs totaled approximately $350 million. The total funding figure isn't disaggregated between urban and rural based providers; however the total amount demonstrates the substantial funding that fuels the competition of California healthcare providers striving to serve underserved populations across the state. FQHCs are also designated urban or rural under the metropolitan area [MA] definition from OMB. The first impact relates to the Medicare reimbursement payment limit mentioned above. Payment limits for both urban and rural FQHCs, $106.58 and $91.64 respectively, are significantly higher than that of the RHC. This serves to explain why clinics are motivated to move from RHC to FQHC status, and why the hospital-based RHCs fight to have their payment caps lifted. Given the additional $15 on the payment limit for urban FQHCs, it would seem that using the blunt MA definition would be a benefit to Medicare providers, since the OMB system designates more than 60% of the area in California as metropolitan/urban. But Kathleen Maestas of the California Rural Health Policy Council points out, "that's the rub." By using the broad MA definition from OMB many FQHCs designated urban are truly rural providers by the nature of the geography and populations served (Maestas). Higher Medicare payments may be a benefit, but with an urban designation these legitimately rural providers must compete with other urban providers for that large pool of Section 330 grant monies. Such grants are frequently awarded on the

basis of population served. Hence, a rural FQHC is no longer competitive based on population standards. Lou Mendonsa, currently CEO of the Shingletown Medical Center in Shasta County, shares an example:

> I worked for four years in an HIV program. Each year, smaller 'rural' programs were cut 5% with the money being redistributed to the larger 'urban' areas. We had no numbers, so were powerless to affect the change. After seven years of that, the program is now caring for a few more people but my former position has been eliminated. If it all goes to numbers only, we are done for… The reality is that we can never compete on a numbers basis. (Mendonsa)

For that reason, Mr. Mendonsa and other rural providers in California have aligned themselves more closely with advocacy groups like the California State Rural Health Association [CSRHA] that share a voice exclusively dedicated to meeting the healthcare needs of rural residents. The California Primary Care Association [CPCA] is intended to represent the interests of all primary care clinics, urban and rural alike. However, the CPCA has lost the support of some rural providers that feel the association advocates more rigorously for the urban providers in the state, to the detriment of rural health.

The 1997 Balanced Budget Act [BBA] seems to approach controlling Medicare costs, without directly targeting rural providers. Payments to providers were slated for cuts across the board. However several groups, including the National Rural Health Association, have all decried the effects of the cuts and warned of the impending harm (Wildavsky). It remains that the county-based, metropolitan area [MA] definition employed by CMS in designating rural and urban FQHCs creates an inequitable circumstance in which truly rural healthcare providers simply cannot compete with large urban providers for much needed

public funds. There are more equitable measures that paint a more accurate picture of rural areas. Of course, Rural Health Clinics are designated based on the much more precise urbanized area [UA] definition. Why not apply this as a standard measure to all providers requesting a rural designation from CMS? Or, why not consider the MSSA definition of rural as a consistent measure of both rural and medical service needs in California?

*How does California's MSSA classification system impact healthcare providers?* The medical service study area [MSSA] boundaries present some intriguing circumstances with regards to the federal health funding programs administered by the U.S. Department of Health and Human Services [DHHS]. The relationship with the CMS Rural Health Clinics program is mentioned above, and the relationship with HRSA is also significant. California was one of the last states to develop a Cooperative Agreement with HRSA. (Cooperative Agreements are grant financing mechanisms used by HRSA in areas of high programmatic involvement.) But, when a Cooperative Agreement was established in 1992, one of HRSA's first initiatives was to officially recognize the MSSAs as "rational service areas," a key criterion for HRSA determining health professional shortage areas [HPSAs] and medically underserved areas [MUAs] (Burnett). California's Cooperative Agreement grants the Office of Statewide Health Planning and Development [OSHPD] resources and responsibility to process all provider applications for the various HPSA and MUA designations. Since 1992, HRSA has invested approximately $2.5 million in the MSSA process through the Cooperative Agreement. In 2002 HRSA awarded OSHPD supplemental grant funds totaling $100,000 to implement geographic information systems [GIS] technology that modernized the MSSA reconfiguration process following Census 2000. Although the impact on healthcare providers is exponentially greater than a few million dollars, because the MSSA, serving as rational service area, determines eligibility to

apply and compete for the lion share of DHHS and other federal health funding programs, including the approximately $350 million of Section 330 funds discussed earlier. All told, the MSSA classification system establishes eligibility designation for just under half a billion dollars in federal monies awarded to California healthcare providers annually.

The California Rural Health Policy Council [CRHPC] and the California State Rural Health Association [CSRHA] assert that a move by HRSA to adopt MSSA rural designations would best leverage the ongoing HRSA investment in the California Cooperative Agreement, given the substantial historical investment in California's MSSA system and the adoption of MSSA boundaries in eligibility determinations for the majority of HRSA funding programs. HRSA's Office of Rural Health Policy also made an investment in the development of RUCAs. However, the investment in California's MSSA framework obviously includes a much larger fiscal impact and a more comprehensive scale than the RUCA project. More importantly, the RUCA system is incompatible with other census-based geographic systems used in federal programs. The MSSA methodology yields census-based, rural designation results complimentary to the existing HPSA and MUA designations currently administered by HRSA and applied to their other healthcare programs.

*How has the MSSA methodology worked for California?* The medical service study area [MSSA] reconfiguration process, following the release of Census 2000, provides an interesting case study in drawing administrative boundaries. The MSSA boundaries date back to the 1970s, and have been reconfigured, or redrawn, based on updated census geography and new census data following each decennial census. With Census 2000, two innovations transformed the California process. HRSA encouraged local community participation during the1990 MSSA reconfiguration, primarily in a few urban communities.

The Office of Statewide Health Planning and Development [OSHPD] expanded the effort to include at least one community meeting in each of the state's 58 counties. This was a substantial commitment because many California counties are very remote, rural areas. Local participants were often surprised to see state government staff "in their neck of the woods." The public meetings brought together local healthcare providers in each community. Together, the groups represented stakeholders in the federal designation process that is served and supported by the MSSA system. Using MSSA General Rules for structure, local communities were empowered to draw local MSSA boundaries according to their superior knowledge of service delivery patterns and other geographic features.

OSHPD facilitated these interactive planning sessions with a second innovation. An Office-wide implementation of geographic information systems [GIS] had already begun in 2002, and the MSSA reconfiguration process was quickly identified as an excellent pilot project. With the added support of a small HRSA grant, OSHPD developed a portable GIS solution that incorporates automated districting tools similar to those used in political redistricting efforts (i.e. city council districts, county supervisor districts, legislative districts, etc.) The technology was packaged with local Census 2000 census tract boundary map files in association with relevant Census 2000 population and socio-economic data sets. The GIS tools were used in each county to engage local healthcare community stakeholders in interactive sessions to identify their local needs and draw the MSSA boundaries precisely and effectively according each community's distinct local knowledge of their own healthcare environment. GIS tools allowed all stakeholders to test different configurations of the county in a real-time, interactive process, until consensus was achieved (Burnett). The results of each community meeting were recorded in official motions and presented to the California Healthcare Workforce Policy Commission [CHWPC], which reviewed and

approved of new MSSA boundaries for each county. This offered the local community stakeholders another opportunity for public comment or to engage the Commission in discussion regarding the process. Once the Commission approved the motion, the new MSSA boundaries were in effect and subsequently adopted by HRSA as rational service areas for California designations.

*What lessons has California learned from its MSSA reconfiguration process?* The California Office of Statewide Health Planning and Development [OSHPD] learned much during 2003, when the medical service study areas [MSSAs] were reconfigured for the state. The two innovations cited above offer equally important lessons. Local public participation and review of administrative boundaries is critical to accurate assessment of local healthcare services needs and eligibility requirements for government funding programs. Not only is local knowledge injected into the fabric of the boundaries, but the process is transparent; encouraging public comment and review throughout the process. The authority of a statutory or legislative body approving administrative boundaries also lends credibility to the process. Geographic information systems [GIS] enabled OSHPD staff to package the relevant data and maps, and present it the local community in such a way that is fostered the interactive nature of these public meetings and empowered local healthcare stakeholders to focus on the planning process itself instead of the details of boundary lines and databases. This reflects a tremendous improvement over the 1990 MSSA reconfiguration, which included only limited community involvement in only urban areas. During the 1990 process, much time was spent simply putting together paper maps. Identifying where poverty populations existed was not possible. GIS offers a powerful tool to those agencies engaged in the determination of administrative boundaries.

*How does the MSSA rural classification system fall short?* Medical service study area [MSSA] boundaries are constructed with one or a combination of census tracts. The census tract is the smallest geographic unit recognized, in code, by HRSA for the application of rational service areas. Rational services areas are the basis for HPSA and MUA designations that qualify California providers for half a billion dollars in federal funding, through Section 330 of the Public Health Services Act. Therefore the MSSA system cannot move below the census tract level in delineating rural from urban areas, as does the more precise Census Bureau urbanized area [UA] definition. Census tracts are small, relatively permanent statistical subdivisions of a county, designed to be relatively homogeneous units with respect to population characteristics, economic status, and living conditions, census tracts average about 4,000 inhabitants (Census). Census tracts, and thereby MSSAs, are very effective in delineating and studying urban areas. However, there are rural areas in California that do not report 4,000 inhabitants in an entire county. Census tract and MSSA boundaries are simply not accurate in areas of limited population. Further problems exist because census tracts and MSSAs are nested within counties. Residents of small communities across California, located along county borders, frequently cross into neighboring counties for healthcare services, or other services generally. These circumstances again point to the Census Bureau's urbanized area definition as a superior solution for designating rural areas. However, the UA definition still falls short in that it does not offer distinct "service area" delineation, which is of interest to rural as well as urban healthcare providers. Simply designating a majority of the state as rural is not enough to act as an effective agent for public policy in rural California. Lou Mendonsa, considering the MSSA and other rural definitions, summarizes, "Tinkering with the current system[s] may not be the best option."

## Conclusions & Recommendations

California and other western states are constrained by the limitations of traditional geopolitical, administrative boundaries. County boundaries are especially ineffective in delineating like populations. The commonly used, county-based metropolitan area [MA] classification system maintained by the U.S. Office of Management and Budget [OMB] provides only a blunt tool for distinguishing rural from urban communities in California. Many metropolitan counties in California are home to remote, rural populations that simply go unrecognized under the OMB system. Federal and state programs have developed alternative rural definitions intended to address the issues of large county units. Three rural classifications were presented and discussed in this paper. The most precise measurement of urban populations is provided by the urbanized area [UA] definition managed by the U.S. Census Bureau. By exclusion, the UA system defines a majority 95% of California as rural area, regardless of county boundaries. This is important because rural healthcare providers often serve communities across county boundaries. Various rural definitions are applied as eligibility requirements for rural specific funding programs administered by various federal and state agencies. Other rural definitions, developed by the Federal Office of Rural Health Policy [ORHP] and the State of California, employ ZIP Codes and census tracts, respectively, to identify rural populations below the county level. ZIP Codes are a poor measure of populations due to the inconsistent, non-standard, heterogeneous nature of the geographic ZIP Code databases. Census tracts offer a superior measure of sub-county populations because the units are consistent, standard, and homogenous identifiers intended to capture and display population data. However, in designating rural communities there are disadvantages to census geography as well. Census tracts are effective at delineating urban populations in urban areas, but much less

accurate when identifying rural areas. Also, census tracts are nested within counties, a fact which presents unrealistic constraints when trying to capture rural health service areas that frequently cross county borders. Currently, the different definitions employed by the federal government to designate rural areas, in combination, impose a competitive disadvantage on some California healthcare providers that need to apply for federal funding programs in order to sustain healthcare services delivered to rural communities.

The following example illustrates the impact of rural designations presented in this paper. Figures 5 and 6 present an actual look at the physical locations of two healthcare providers serving populations in distinctly different areas of California. The Shingletown Medical Center is located east of Redding in the hills approaching the Lassen National Forest, in Shasta County. Shingletown is home to approximately 2,200 residents. Mountain Health & Community Services is located in Campo, a small California border town of just over 3,000 people, in southern San Diego County near Mexico. Both are located in distinctly rural environments. Both clinics are Federally Qualified Health Centers, and both are designated urban because both Shasta County and San Diego County are identified as metropolitan areas [MAs] under the OMB definition. Each provider, serving a relatively small, rural population base, faces a stark challenge to compete for federal health funds with legitimately urban providers that serve large metropolitan populations. Simultaneously, the ORHP RUCA definition fails to recognize either clinic in a “rural” ZIP Code, determining each ineligible to compete for federal Rural Health grants. The results of different rural definitions in combination create an inequitable competitive environment that excludes some rural providers from competing for the federal funds needed to adequately serve the rural populations living in the rural communities of California.

Figure 5. Shingletown Medical Center is designated “urban” by federal health agencies.

Figure 6. Mountain Health Services is designated “urban” by federal health agencies.

Population growth is a key factor in the future of California, and it is the driving force that will most impact rural communities and rural healthcare delivery into the future. Greater attention will be placed on the accuracy of rural designations, as the importance of sustainable healthcare services places increasing burdens on rural communities straining under the influx of population. California can expect population growth of approximately 500,000 people each year, which translates into more than 5 million each decade, and more than 45 million total population by 2025 (Walters). Approximately 80 percent of the population growth is estimated to occur in the central valley. A majority of the central valley is already defined as metropolitan/urban by OMB. But generally, the central valley is an agricultural area, home to many small communities that are primarily rural in both characteristics and needs. The central valley also includes many pockets of poverty, where medically underserved populations are masked by the per capita measures of the area. Typically, these communities have a few wealthy landowners and the majority of the population is under the federal poverty level doing farm work or other low wage jobs (CRHPC). Such circumstances will be perpetuated with the population growth projected in the central valley. In turn, substantial healthcare demands will increasingly fall to the rural healthcare community, asked to deliver services to low income and uninsured populations. The absence of urban market conditions will undoubtedly place significant burdens on the rural providers in central valley communities over the coming years. Such growing pains underscore the need to address the rural designations issue, so that these areas are actually eligible for the federal funds necessary to sustain adequate access to healthcare services for all Californians in the long view.

A conclusion and recommendation, for federal and state government alike, is to break from conventional classifications based exclusively on administrative, often arbitrary, geopolitical

boundaries merely out of comfort or convenience. Alternative methodologies need to be explored and systems developed. Governments will strive to standardize the delineation of rural areas, but the current definitions are not just inconsistent from agency to agency. Too often the federal definitions of rural are in direct conflict with one another, which impacts the administration of programs and places undue burdens on program participants that are continually frustrated by the proposition of having to justify a rural designation. Williams and Cutchin, writing in the Journal of Interprofessional Care, suggest there are seven themes relevant to the rural concept: Land use; demographic structure; nonmetropolitan area; environmental characteristics (such as open space or countryside); population density; population characteristics (degree of homogeneity); and commuting patterns (Williams). USDA, OMB, and the Census Bureau have thoroughly worked out methods dealing with nonmetropolitan area, population density, commuting patterns, and even population homogeneity to some extent. However, agencies often approach one or two themes independently of the other rural themes, and methodological accuracy suffers. Perhaps a composite measure incorporating these seven themes might present a superior rural definition, something of a “gold standard” to compare against other standard rural definitions (Zweifler).

A composite approach to rural definition is an alternative way of addressing the issue. A second recommendation is needed to support the composite approach. Geographic information system [GIS] technologies offer a tremendous advantage in the study of rural communities. A common geographic framework allows researchers, administrators, and the public to visualize different sets of information together in one space; information that is otherwise separate and distinct in presentation. For example, the seven rural themes listed above can be layered and viewed together using GIS tools. The possibilities for rural study

quickly become evident, as traditional political boundaries become less relevant in a geographic environment. Researchers can use GIS to identify characteristics that distinguish urban from rural areas, and support alternative rural systems development. GIS can be used to study the physical infrastructure and built environment of different communities to more accurately distinguish urban from rural. Water and sewer systems, public transit, sidewalks, streetlights, and other urban elements can be identified and measured to then precisely classify rural communities where these elements are not present. Another measure would be energy consumption or studying the lighting in a community at a night using satellite images (Zweifler). GIS provides the ability to display infrared satellite imagery, aerial photography, land use mapping, zoning information, and environmental data in a single layered display, with traditional data sets such as population density, demographics, and commuting data. The idea of a composite rural measure is made possible through the application of GIS, as are other rural methodologies yet to be imagined. Implementing GIS technologies and adopting alternative approaches that incorporate a broad range of information and perceptions not before considered in one environment can dramatically improve rural identification processes. It is a robust tool that empowers effective decision support and policy making. GIS is especially appropriate to this particular issue because geography matters in the study of rural communities.

The final recommendation is actually an assertion that the best measure of rural will be found in the communities. Rural health researchers, Williams and Cutchin, performed a thorough review of the literature before presenting the seven rural themes described above, and then concluded that the best approach to defining rural is to ask the rural communities. Who knows better than the communities what rural means? Perhaps it is not the federal agencies developing rural definitions. Local perception is the key. Ask the communities.

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